

REMARKS

Applicants have now had an opportunity to carefully consider the Examiner's comments set forth in the Office Action of March 6, 2007.

Reconsideration of the Application is requested.

I. The Office Action

The specification stands objected to under 35 U.S.C. §112.

Objections were raised to Figures 3-6.

Claims 1-11 and 21 remain in this application.

Claims 1-11 and 21 are rejected under 35 U.S.C. §112, as being indefinite for failing to particularly point out and distinctively claim the subject matter which applicant regards as the invention.

Claims 1-5, 9-11, and 21 stand rejected under 35 U.S.C. §102(a) as being anticipated by Lohmann et. al. (*GLYCO-FRAGMENT: A Web Tool to Support the Interpretation of Mass Spectra of Complex Carbohydrates*, hereinafter Lohmann).

Claims 6-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Lohmann in view of Yergey et al. (*Isotopic Distributions in Mass Spectra of Large Molecules*, hereinafter Yergey)

II. Objection of Specification Under 35 U.S.C. §112(a)

The specification is objected to under the first paragraph of 35 U.S.C. §112 as not containing "a written description of the invention...in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains" to make a or use the invention in its best mode. Applicants respectfully traverse the rejection.

It is first alleged that it is not apparent, as to how the references, fully incorporated into the instant application, are related to the instant invention. The first reference titled "Analysis of Proteins from Biological Fluids Using Mass Spectrometric Immunoassay" teaches the ability to perform high performance analyses on specific biomolecules from biological fluid and identify, recognize, and quantify targeted biomolecules similar to the instant invention. The second reference entitled "Automated Identification of Peptides" relates to a computer-mediated method for interpreting data obtained by mass spectrometry and using a stored database to compare and identify

results, which was also incorporated into the present invention. It is pointed out that both references refer to different chemical entities; however, the present application refers particularly to carbohydrates covalently bonded to proteins, and proteins are made up of multiple peptides. Therefore, although the applied algorithms may be different, many of the concepts and methods of the references are relevant as background teachings for the present application. Applicants respectfully request that the objection be withdrawn.

It is further argued the specification is unclear as to which mass spectra, unfragmented ions or glycan fragments, are analyzed. It is presently considered the concepts of the application may be used for both fragmented and unfragmented glycans, as one skilled in the art would understand that each would require somewhat varying algorithms and cartoon representations. The present application teaches to both.

The paragraph after [0021] has been added to the specification per the Examiner's request to clearly define the term "cartoon" to avoid ambiguity. Support for this change may be found in originally filed claim 11.

Paragraph [0025] has been amended to clarify the formation and contents of a monosaccharide set table. Applicants further amended the paragraph to highlight that the monosaccharide set table is discussed in greater detail with reference to Figure 4.

The Office Action next states it is unclear as to how the set of glycans is formed in the Table. The tables represented in the present application exemplify the possible combinations of monosaccharides that may comprise 5 HexNAcs and 4 Hexoses, as examples of glycan isomers. See paragraph [0033]. The tables simply represent a sample of what such tables would comprise.

Paragraph [0028] has been amended to clarify the cartoon dictionary and what its contents represent. Support for this change may be found in currently amended claim 3. See paragraph [0030].

Paragraph [0029] has been amended to clarify the use of rules in generating a cartoon dictionary. As explained in the amended specification, the rules in paragraph [0029] are used for creating a larger cartoon dictionary only.

In view of the foregoing, Applicants submit the specification is in acceptable condition and respectfully request the Examiner to withdraw the objections.

III. Objection to Figures 3-6

The Office Action objected to Figures 3-6 as being unclear and more appropriate for description in the text. Applicant respectfully traverses the objection.

Figures 3-6 depict the method for automated identification of glycans, construction of a monosaccharide set table, and the method for peak identification. According to 37 C.F.R. 1.83 “conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g. a labeled rectangular box). Therefore, since the methods are fully described in the written description, the flow charts in Figures 3-6 are an appropriate representation and Applicants respectfully request the Examiner to withdraw the objection.

Further, it has been requested that Applicants furnish an additional drawing illustrating at least one row of the monosaccharide set table comprising 5 HexNAc and 4 Hexoses with a particular mass. Applicants note that the example described in paragraph [0025], 5 HexNAC and 4 Hexoses, is referred to throughout the remainder of the description and the table (displayed on page 9, above paragraph [0034]) depicts a monosaccharide set table for the abovementioned example glycans. The table shows multiple rows of the set table and the associated masses of each row.

The Office Action also requests Applicants to furnish an additional drawing to illustrate assigning glycan cartoons to mass spectra signals. Applicants do not believe a drawing of said matter is needed for a proper understanding of the claims, as the concept is fully described in the detailed description. As such, Applicants respectfully request the Examiner to withdraw the request for additional drawings.

IV. Rejection of Claims 1-11 and 21 Under 35 U.S.C. §112

Claims 1-11 and 21 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully traverse the rejection.

With respect to claims 1 and 21, the Office Action stated it is not apparent as to how it would be possible to obtain less than one spectrum from a mass spectrometer and as to what would be obtaining two, three, or more mass spectra from a mass spectrometer. Applicants note that they do not claim obtaining less than one spectrum from a mass spectrometer; however do allow for obtaining more than one glycan spectra simultaneously. Further, it was argued the claims are not clear as to how it is possible to for a person of ordinary skill in the art to go from the step of receiving “no less than one glycan spectrum” to “assigning glycan identification to said peaks” without an intermediate step. Applicants amended claims 1 and 21 to clarify how such peak assignments are made.

Claims 2, 3, 4, 6, 9, 10, and 11 stand rejected as being unclear. Applicant notes that claims 2, 3, 4, and 6 have been amended for clarify. Applicants respectfully traverse the rejection of claim 9. Claim 9 recites combining information from a plurality of spectra, which Applicant believes clearly identifies what information is to be combined. Applicant further disagrees with the Examiner that claim 11 is unclear how the cartoons are related to the rows in the glycan set table. The claim recites that cartoons are symbolic representations for the rows from the monosaccharide table, which clearly identifies the relationship between the cartoons and the rows. The Examiner also questions the necessity of the monosaccharide table recited in claim 2. The monosaccharide table referred to in claim 2 specifies a particular method for identifying glycans. Further, the Examiner noted the term “isotope of monosaccharide” was not technically correct, therefore Applicant amended claim 4 to recite “glycan isomer” as opposed to “isotope.”

Claim 5 stands rejected as being unapparent as to what “setting said calibration explicitly” means. Claim 5 has been amended to clarify that it is the user who calibrates the glycan spectrum.

The Examiner rejected claim 7 as being unapparent as to whether the claim

recites an error range. Applicants note that said claim does not recite a specific error range, but instead recites a quality assessment to determine the likelihood that the peak assignment is correct. Applicants amended claim 7 to clarify said quality assessment.

With respect to claim 8, the Examiner noted that the claim should recite “mass for a selected peak” rather than “mass of a selected peak.” Claim 8 has been amended to reflect the Examiner’s suggestion. Applicants further amended Claim 8 to clarify that the isotope envelopes may be computed using naturally occurring isotopes or isotope labeled molecules.

Applicants note that the above recited claims have been amended, not for reasons of patentability, but merely to clarify the claims

V. Rejection of Claims 1-5, 9-11 and 21 Under 35 U.S.C. §102(a)

Claims 1-5, 9-11 and 21 stand rejected under 35 U.S.C. §102(a) as being anticipated by Lohmann et al. It is respectfully requested that this rejection be withdrawn for at least the following reasons. Lohmann et al. does not teach or suggest the subject embodiment as set forth in independent claims 1 and 21 (and claims 2-11 which depend therefrom).

Independent claim 1 (and similarly independent claim 21) has been amended to recite a computerized method for identifying peaks corresponding to glycans from a mass spectrum, wherein resulting peaks are assigned identifications by comparing the measured mass to a customized monosaccharide set table, and subsequently creating a glycan report in which each peak may be represented by a corresponding cartoon. A cartoon dictionary is included in the memory of the computerized method and includes cartoons as symbolic representations for each row of the monosaccharide table. See paragraphs [0027] and [0028]. The cartoon dictionary is created by generating rules from an initial set of cartoons loaded into the computer by the user. See paragraph [0029]. The rules are created so that they rarely create a biosynthetically implausible cartoon. [0029].

In particular, Lohmann et al. does not teach or suggest labeling each peak in resulting spectra with cartoons of the glycans they represent. In order for a §102 rejection to be upheld, it must be shown that all elements of the claim in the application

are contained in a single prior art reference. Accordingly, Lohmann et al. does not contain the element of creating a glycan report consisting of cartoon representations of each corresponding peak as recited herein, thus distinguishing it from the claims of the present application.

Likewise, claim 21 as amended is the article of manufacture comprising the computer usable medium to perform the method steps for identifying peaks corresponding to glycans from a mass spectrum of claim 1. Lohmann et al. does not discuss a computer usable medium. Further, similar to claim 1, Lohmann et al. fails to teach or suggest creating a glycan report consisting of cartoon representations of corresponding glycan peaks, therefore does not anticipate claim 21. The above claims 1 and 21 thus teach a concept not taught or fairly considered by the cited references. Particularly, key problem in proteomics is the identification of the glycans as discussed in the present application. However, presently there is no practical automated method for identifying these glycans in an efficient manner to facilitate the labeling of the peaks in the spectra and the identification patterns that are otherwise not readily observed from the non-automated processes. Thus, the present concepts allow an easy manner for a user to obtain the information they require.

For at least the above mentioned reasons, Allen does not teach or suggest the subject embodiment as recited in independent claims 1 and 21 (and claims 2-5 and 9-11, which respectively depend therefrom). Accordingly, it is respectfully requested that this rejection be withdrawn.

VI. Rejection of Claims 6-8 Under 35 U.S.C. §103(a)

Claims 6-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Lohmann et al. in view of Yergey et al. It is respectfully requested that this rejection be withdrawn for at least the following reason. Claims 6-8 are dependant on independent claim 1 and Yergey et al. does not make up for the aforementioned deficiencies of Lohmann et al. Thus, the withdrawal of this rejection is respectfully requested.

VII. New Claims 22-28

Applicants have added new claims 22-28. These claims also emphasize certain valuable features of the present application not taught or fairly suggested in the existing art. Particularly, these claims define a system which does not require a biologist or other person to estimate the accuracy of the spectrum analyzer, as this may be determined automatically, *i.e.*, the automatic computerized estimation of the present claim. Further, glycan assignments are associated with the confidence score as shown in the assigning step of the present application. Still further, the set of possible glycans which may be used are shown to be customizable such that they may be adaptable to possibly types of glycans that may be tested. Further, by labeling the peaks of the spectra with cartoons, a quick, accurate representation to the user is provided.

CONCLUSION

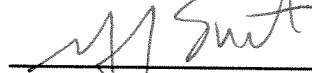
For the reasons detailed above, it is submitted all claims remaining in the application (Claims 1-11 and 28) are now in condition for allowance. The foregoing comments do not require unnecessary additional search or examination.

No additional fee is believed to be required for this Amendment A. However, the undersigned attorney of record hereby authorizes the charging of any necessary fees, other than the issue fee, to Xerox Deposit Account No. 24-0037.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he/she is hereby authorized to call , at Telephone Number (216) 861-5582.

Respectfully submitted,

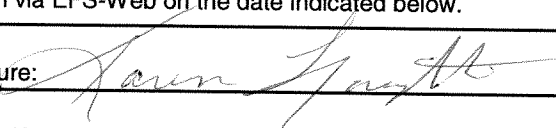
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Date

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